SPATIAL AND SEASONAL PRICE DIFFERENCES FOR SORGHUM AND SESAME IN SUDAN

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ABSTRACT

Spatial and seasonal price differences for sorghum and sesame in the Sudan are investigated. A conceptual model of competitive market behavior in time and space dimensions is adopted to test the spatial and the seasonal price differences as compared to transportation and storage costs, respectively. The large differences in sorghum prices among regions indicate a lack of market integration between producing and consuming regions. Monthly price changes for sorghum and sesame compared to storage costs indicate an opportunity to capture above normal returns to storage. Causes of these large price differences are inadequate transportation and marketing infrastructure and government policy.

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SUMMARY

The rapidly growing demand for food products and the recurrent food shortages in Sudan have induced producers, consumers, and policy makers to question the performance of the food marketing system. This concern is understandable because marketing activities, especially in developing countries, are sometimes incorrectly viewed by producers, consumers and policy makers as unnecessary, unproductive, and inefficient. The competitiveness and efficiency of marketing institutions and markets determines the extent of price differences between producers and consumers over space and time and therefore influences producer, intermediary and consumer allocation decisions. The objective of this study is to analyze seasonal and regional price differences (price spreads) and margins between producers and consumers for sorghum and sesame produced in the rainfed subsector of Sudan.

Price differences among regions for 1987 are analyzed using survey data. The regional price differences are compared to transportation costs to analyze the market integration among regional markets. Monthly price data were analyzed for sorghum and sesame to examine seasonal price movements as compared to storage costs. The Gadarif and El Obeid areas of production and the Khartoum area of consumption were chosen for the

survey. A total of 296 respondents at different stages in the marketing chain was interviewed in the three areas.

The analysis revealed that spatial price spreads between producers and consumers are quite large for sorghum that has no processing functions performed by the marketing system. Regional price differences reflect the absence of market integration between the production and consumption regions. Seasonal price spreads increase about 25 percent from the index low to the high on average for sorghum (deber) in Gadarif, and about 29 percent for sorghum (feterita) in El Obeid. For sesame, the monthly wholesale price range is 25 percent in Gadarif. Excess profits can be earned by those who perform the storage function if they buy on the seasonal low and sell on the seasonal high.

Considering the results of the analysis of the marketing margins, price spreads, and the underlying causal factors, a number of policy conclusions for private and public management are drawn. Feeder roads to connect the rural markets and inland areas of production with the main highways leading to consuming centers and export markets would lower transportation and marketing cost. Changes in government policy toward parastatal marketing agencies and exchange rate reform could improve producer prices, competitiveness and export earnings. There is a need to invest in collecting and disseminating timely and accurate market information to improve management decision making. Time and again one

would find producers or even assembly traders (lorry traders) moving products from a village or a rural market to an intermediate market and finding prices lower than where they purchased the product.

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INTRODUCTION

The agricultural sector in Sudan, as in many developing countries, is largely organized on the basis of private and public ownership. The agricultural sector can also be classified into irrigated and rain fed subsectors. The rainfed subsector, which is more important in terms of area and amount of production, constitutes about 80 percent of the total area under cultivation. Almost solely organized by private ownership, the rainfed subsector produces the bulk of the sorghum food grain, all the sesame, and a very large share of the country's groundnuts production. The irrigated subsector, composed mainly of government owned land, constitutes about 20 percent of the total cultivated area in the country. In this subsector, the government is responsible for management and provision of certain production inputs such as land, irrigation water, fertilizers, etc. The farmers, who work as tenants, provide labor for the different production and harvesting operations.

The rapidly growing demand for food products produced in both subsectors and the recurrent food shortages have induced producers, consumers, and policy makers to question the performance of the food marketing system. This concern is understandable because marketing activities, especially in developing countries, are sometimes incorrectly viewed by producers, consumers and policy makers as unnecessary, unproductive, and inefficient. Where transportation and communication facilities are poor, and access to institutional financing restricted, these views may be correct. Under these circumstances, "it is important

for the food policy analyst to determine how effectively marketing institutions and marketing agents are performing their dual role of transforming commodities in time, place, and form while reflecting relative abundance and scarcity through the price signals communicated to producers and consumers. These price signals can be generated in the process of exchange in markets in which case the competitiveness and efficiency of the markets must be examined." [Timmer, et al.]. The efficiency of marketing institutions and markets determines the extent of price differences between producers and consumers over space and time and therefore influences producers incentives, farm profitability, resource allocation and production levels. The objective of this study is to estimate these price differences (price spreads) and margins between producers and consumers for sorghum and sesame produced in the rainfed subsector of Sudan. More specifically the objectives of the study include the analysis of spatial and seasonal price spreads and regional price differences for sorghum and sesame.

METHODOLOGY

To achieve the stated objectives, price data at different levels in the marketing channel were collected for sorghum and sesame to measure marketing margins and regional price differences. Price differences among regions (spatial analysis) for 1987 are analyzed using survey data rather than the more conventional correlation analysis with time series data. The lack of price data for several markets and years prevented the use of correlation analysis as a means of testing market integration. The regional price differences are compared to transportation costs to analyze

the market integration among regional markets. Monthly price data were analyzed for sorghum and sesame to examine seasonal price movements as compared to storage costs in two markets. Storage costs are calculated from the survey data and includes warehouse rent, interest charges on capital invested in the stored commodity and physical losses of grain.

The Gadarif and El Obeid areas of production and the Khartoum area of consumption were chosen for the survey. Gadarif and El Obeid are two major producing areas for sorghum and sesame, and Khartoum is the most important consuming region in the country. The Gadarif area was also selected as a producing area for sesame destined for export through Port Sudan. Sorghum for export, however, has not been considered as exports are banned at present because of the crop shortages that took place during the last two seasons.

Within these production and consumption areas, multistage stratified random samples were selected. First, five villages were selected randomly, and from each village 12 farmers were selected to give a total of 60 farmers in each area of production. Second, three merchants were selected from each village to give a total of 15 merchants in Gadarif and El Obeid. Third, 15 assembly traders were selected from 3 rural markets in each area, and 10 wholesalers were selected from the central market. In addition, five sesame exporters and one processor were selected from Gadarif Central Market. A total of 100 respondents at different stages in the marketing chain was interviewed in the El Obeid area and 106 in the Gadarif area. In Khartoum, 60 retailers from residential areas, and 30 wholesalers/retailers in the terminal markets were selected. The primary data were collected using a structured and pretested questionnaire through

a one visit interview during March/April 1987. The secondary monthly wholesale price data, on the other hand, were obtained from the monthly and annual bulletins of the Ministry of Agriculture and Natural Resources, Khartoum.

With regard to quality, due to the absence of grading systems, the commodities selected are of average standard quality as known by practice among traders. Quality, as it relates to processing, is examined for the prices used in the analysis. Locally consumed sesame, for instance, is processed before it reaches the ultimate consumer. Farm prices are for sesame, but retail prices are for oil and cakes. A sesame price equivalent in this case is calculated using a conversion factor and processing costs.

Estimates of marketing margins and regional and seasonal price spreads are averages using the quantities marketed in various regions and at different levels in the marketing chain as weights. Prices paid at any one time and at any level differ from place to place within the country depending on the kind of market or level in the marketing system at which transactions take place. Four such levels are distinguished for sorghum:

a) Village shopkeepers

The village shopkeepers deal in consumer goods and various crops produced by farmers. The shopkeepers buy sorghum and sesame for their own benefit or on behalf of some urban buyers. Because of the lack of or scarcity of working capital, village shopkeepers become agents to urban buyers who provide the working capital and packing material such as jute sacks. In many cases they play another important role, which is money lending.

b) Primary or Rural Markets

Primary markets are markets in rural areas where most of the crops are sold by producers to other producers or to traders. The producer price considered in this study is the price in the primary or rural market which represents the first point of sale.

c) Intermediate or Central Markets

These markets may be in rural areas or towns. The commodities under consideration are being sold by traders who have previously purchased them at "primary markets" to other traders who sell the commodities at the "terminal" markets. Organized auction markets are important intermediate markets especially for sesame and other export crops.

d) Terminal Markets

Most of the commodities are sold to processors, wholesalers and retailers at the terminal markets. Retail prices for domestic consumers were collected at these markets. Administered prices at the retail level, such as ration (government controlled prices) prices, are not considered in estimates of prices spreads.

A THEORY OF TRANSPORTATION AND STORAGE

Since the production of sorghum and sesame in the Sudan is far in excess of the local rural consumption requirements, a large surplus is available for transfer to urban centers for consumption or export to other countries. The harvesting of the commodities considered in the present

study takes place during the months of October to December. The consumption of the commodities requires changing their form, a process which takes place throughout the year to meet continuous demand.

The question of commodity transfer, therefore, involves interregional flows, storage and processing. The following sections present a theoretical framework for analyzing the transportation and storage functions.

Interregional Trade

Figure 1 represents trade flows for a homogenous commodity between two regions, X and Y, and the equilibrium level of trade and prices. In the absence of trade, prices and quantities traded are determined by the domestic supply and demand curves for each region. The equilibrium price in region Y is P_y and that in region X is P_x. When trade flows between the two regions, assuming no transfer costs, the intersection of the excess supply curves at j represents the equilibrium OC. The distance C_j (equal to Oh) represents the quantity of the commodity exported from Y to X.

With the introduction of transfer costs equilibrium prices will be lower in the exporting regions than in the importing regions (the difference equals the transfer costs). This effect is shown in Figure 2 by displacing the supply and demand curves in region Y, the exporting region, upward by an amount t, the unit cost of interregional transfer. With this adjustment, any horizontal line across the diagram represents prices in the two regions that differ by the amount of transfer cost. Thus the intersection of the excess supply curves, which defines the equilibrium prices with trade, shows that the equilibrium price in region X is OC' and that in region Y is O'C'. They differ by the transfer cost t. The volume

traded is the quantity C'j' and is equal to the quantity f'g' shipped by Y and the quantity e'd' received by X.

The effect of transfer costs on trade is that the total volume of trade is reduced, the exact effect depending on the elasticity of supply and demand, pre-trade price differential and the magnitude of transfer cost (See Figures 1 and 2). Reductions in the transfer cost t would increase the price in the exporting region, reduce price in the importing region and increase the quantity traded.

The Case for Storage

The production and harvesting activity as stated previously is highly seasonal, while demand for domestic consumption and export is a continuous process. This underlines the need for storage to allocate the quantities available during the short harvesting season throughout the extended consumption period. Theoretically, this transfer through time can be illustrated using Figure 3.

In the diagram, the horizontal axis OS and the vertical axis OP represent the quantities available during the season and prices, respectively. Two time periods are considered for illustration. D_1 and D_2 are the demand curves for time period 1 and time period 2, respectively. In absence of storage, the supply curve SS' intersects the demand curve D_1 at price P, and all the available quantity OS is consumed in period 1.

With the introduction of storage at a unit cost of $OX = P_2 - P_1$, OC is consumed in period 1 at price P_1 and $Od = CS$ is stored for consumption in period 2 at price P_2. Reducing storage costs to zero results in a price

Ps for both time periods, with Oa consumed in the first period and Ob consumed in the second period. Thus, reducing storage costs raises prices at harvest time, lowers them in the post-harvest period, with consequent reductions and increases in the quantities consumed in the two periods, respectively.

The conceptual framework outlined above is applicable to situations where the market structure is conducive to competitive conditions so that prices of commodities over time and space are equal to the costs incurred in storage and transportation. Departure from these theoretical results in developing countries such as Sudan may occur as a result of poor market intelligence, monopolistic conditions or government intervention to regulate the market.

RESULTS

Spatial Price Spreads

Price spreads between producer and consumer have been estimated for sorghum in Gadarif and El Obeid areas. Farmers in the Gadarif area received about 33.5 percent of the urban retail price for sorghum sold in Khartoum, Table 1. Net returns to assemblers, wholesalers and retailers each were 4.9, 18.0, and 13.6 percent, respectively, of the urban retail price for variety (deber), and gross returns were 17.2, 27.9, and 21.4 percent of the urban retail price. The producer's share of the urban retail price is most affected by transportation costs, local taxes and losses that result from transporting and cleaning the product. Transport costs to move sorghum from the producer in Gadarif to the consumer in Khartoum equal 13.7 percent of the retail price. Losses in the marketing

system are nearly 5.0 percent of the retail price, while taxes equal 3.0 percent.

The spatial price spreads of sorghum produced in El Obeid area and sold in El Obeid town are shown in Table 2. No sorghum is transported from El Obeid to Khartoum because the area is too far from the capital city, and because El Obeid is a deficit area most of the time. The producer's share of the local urban retail price is 55.2 percent, and the net returns to village merchants, assemblers and retailers are 7.7, 4.7, and 3.4 percent of the urban retail price respectively. Transportation costs, taxes and losses again play an important role in the final retail price.

Regional price differences for sorghum between Gadarif, Khartoum, and El Obeid reflect the presence or absence of trading between pairs of towns or markets. The wholesale price in the Gadarif market is 71.5 percent of the wholesale price in El Obeid market. This low price in Gadarif compared to El Obeid is due to the fact that Gadarif is a surplus producing area that is linked to the capital city via an asphalt road. In contrast, El Obeid is an isolated deficit market that is not linked to the other areas because of high transportation cost, poor infrastructure and high petrol prices.

Because of these restrictions, producers receive and consumers pay in the El Obeid market substantially higher prices than in the Gadarif market. As illustrated by the interregional trade theory, trade between the regional markets would increase prices in Gadarif and decrease prices in El Obeid. Based on the relative producer prices, trade would occur between the two regions if transportation costs were less than about LS 73

per ton. Trade does occur between Gadarif and Khartoum where transportation costs are about LS 47 per ton.

Spatial spreads in prices for sesame between the Gadarif and Port Sudan are presented in Table 3. The share to the producer is 68.3 percent of the export price (on f.o.b. basis), and the net returns to assemblers, and wholesalers are 11.1 and 1.9 respectively. Although the wholesaler's net margin might appear rather low, in most cases the assembler and the wholesaler who deliver sesame to the Sudan Oilseeds Company (SOC) in Port Sudan for export, are one and the same person.

The case of sesame for export demonstrates the impact of government intervention in the marketing system on marketing costs and margins. For oilseeds in general, the government annually announces floor prices in auction markets. The government will buy the quantities offered for sale if free market prices fall below the floor prices. The government also monopolizes the export trade through the Sudan Oilseeds Company (SOC). Although the SOC has the right, the SOC normally does not enter the auction market as a buyer. The SOC deals with crop merchants who deliver the purchased quantities to Port Sudan. The analysis shows that the SOC loses about 27 percent on the value of purchased quantities because of the official exchange rate at which the dollar value is converted to local currency (U.S. $1.0 per L.S. 2.965). The local currency is overvalued.

In the case of sesame destined for local processing, the producer's share of the local urban consumer's price (in Gadarif) is 39.6 percent (Table 4). The net returns to processor, wholesaler, and retailer are 5.5, 7.1, and 15.2 percent respectively of the local urban consumer's price. The producer's share of the retail price is much lower in the domestic

processing market than in the export market. These distortions are due to government interventions in the form of controlled prices, monopoly buying company, and over valued official exchange rate. The government appears to be pursuing a policy that diverts as much production as possible to the export market.

Seasonal Price Spreads

Seasonal price analysis tests the effectiveness of market arbitrage over time. Prices of sorghum and food crops in general, follow a common seasonal pattern. Prices decrease to low levels immediately after harvest (December and January for sorghum and sesame in Sudan) and rise thereafter until the next harvest as village merchants and assemblers store some supplies to meet the continuous demand. In a competitive market, the increase in seasonal prices will equal the costs of storage (interest charges on capital invested in the stored commodity, costs of the storage facility, physical losses and normal profits). This is analyzed by comparing the monthly prices with the monthly costs of storage. The monthly price changes are used to calculate an index of wholesale prices, which has been calculated as the average monthly percentage of a twelve-month moving average (Table 5).

In Gadarif, the seasonal price index of sorghum (deber) increases from a harvest low of 93.8 in December to a high of 116.4 in October just before the next harvest. This represents an increase of 22.6 percent in the eleven month December-October period. The storage costs for an 11 month period equals 14.3 percent of the Gadarif wholesale price. This indicates that those who perform the long term storage function are

earning above normal profits. For those who store for periods of time up to six months, the seasonal price increase pays no returns to storage.

For sorghum in the El Obeid market, the seasonal price movement from the December index low of 87.1 to the post harvest index high of 115.8 illustrates the increased variability in prices for this isolated market. Improved market integration would likely reduce seasonal price volatility in that market.

The seasonal price pattern for sesame as reported for the Gadarif market ranged from a low of 90.2 in September to a post harvest high of 115.4 in February. During the rest of the year, the patterns shows relatively little change.

ANALYSIS OF SORGHUM AND SESAME SPATIAL AND SEASONAL PRICE SPREADS

From the analysis in Table 1, it appears that local taxes, transportation costs, storage costs, losses, (measured at the retail level) and profit (as a residual of prices after meeting costs), are the main factors that explain the inter-market differences in price spreads between producers and the ultimate consumers.

Taxes on food grains range between 3 percent and 7.3 percent in Gadarif. These taxes are mainly the Zakat tax, which is a religious tax on the crop levied by the central government and collected by the local authorities. The tax is equal to 10 percent of the total production. Upon delivery of the crop, the government returns 2.5 percent to the producer who is expected to distribute this amount in his own way to the needy. Only the 7.5 percent is considered in the calculation since it's unknown whether producers distribute the expected amount of product. In addition

to the Zakat tax, there are also local taxes levied by the local authorities for developing certain self-help projects. These vary from one area to another and they are generally small in amount. In fact one of the main reasons for organizing auction markets is to facilitate the collection of this particular type of crop tax.

Crop losses during storage and transportation are difficult to estimate and there are no previous studies to indicate their magnitude. For sorghum, however, a rough estimate of these losses is obtained by estimating the loss in weight at the retailer's level. In addition to the impurities there is presumably loss in weight during both transportation and storage. These losses range between 4.5 and 4.9 percent of the product value in the two areas (Tables 1 and 2). For sesame, the losses are estimated at 4.1 percent of crop value at the wholesale level (Table 3). For the processor, losses are estimated at 1.6 percent of the crop value.

Profit margins and storage costs for the different trading agents also contribute to the price spreads. As discussed above, the magnitude of these margins is not a major element in the price differential over space. This leaves transportation as the main element in explaining the spreads in prices between producers and consumers. From the marketing margin tables, the transportation cost is about 13.7 percent of the consumer price for Gadarif area and 11.4 for El Obeid area. The average truck transport costs, according to the Ministry of Agriculture and Natural Resources estimates are about LS 0.11/ton/km on asphalt roads, and about LS 0.70/ton/km on dirt roads.

Sudan is a large country that is very sparsely populated. The population density is only about 10 persons per square kilometer. The

production of food crops, because of favorable environmental conditions, is concentrated in certain parts of the country that are distant from the urban centers where the consumers are concentrated.

In addition to the poor roads and the long hauling distances, these costs also reflect the high cost of fuel and spare parts, both of which are imported. The lack of development of rail and river transport also adds to the transportation costs and difficulties. Further, the use of relatively small trucks (5 to 6 ton lorries) for inter-regional and inter-market transport adds to the cost. Bigger trucks have been recently introduced, but these operate only on asphalt roads which are limited in number and lengths. This lack of diversity in modes of transportation has led to the increase in marketing costs and in the foreign import content of the transportation industry.

CONCLUSIONS AND POLICY IMPLICATIONS

The analysis of spatial price spreads shows that producers receive relatively low shares of the prices paid by consumers. The average producer price, expressed as a percentage of the urban consumer price is 33.5 percent for dura (sorghum) produced in Gadarif area and sold to consumers in Khartoum, the capital city. Producers received about 55.2 percent of the retail price for dura produced in the El Obeid area and consumed locally. For sesame produced in Gadarif, the producers share is 68 percent of the export FOB price, and about 39.6 percent of the quantities produced, processed and retailed in the local area. In the case of exports, the exporting company incurs losses because the official

exchange rate at which the local currency can be converted to dollars is over valued.

Regional price differences, on the other hand, reflect the extent of trading between the two regions. The wholesale price of sorghum in the Gadarif market is 71.5 percent of the wholesale price in El Obeid market. The price spread is relatively large indicating that the two markets, Gadarif and El Obeid, are poorly integrated.

Seasonal price spreads increase about 25 percent from the index low to the high on average for sorghum (deber) in Gadarif, and about 29 percent for sorghum (feterita) in El Obeid. For sesame, the monthly wholesale price range is 25 percent in Gadarif. With an average interest rate on bank loans of about 20 percent annually in March, 1987, there is an indication of excess profits on the part of those who perform the storage function if they buy on the seasonal low and sell on the seasonal high. This is an unlikely event since most storage occurs during the harvest to post harvest period which may not coincide precisely with the seasonal low and high.

Policy Implications

Considering the results of the analysis of the marketing margins, price spreads, and the underlying causal factors, a number of policy conclusions are drawn. Although the Gadarif area is relatively well-served by asphalt roads to Port Sudan and Khartoum, there is a need for feeder roads to connect the rural markets and inland areas of production with the main highways leading to consuming centers and export markets. A policy which improves road conditions, introduces new rail and water

transportation alternatives, decreases the cost of petrol and spare parts would lower transportation and marketing cost.

In the area of exports there seems to be considerable scope for reducing the marketing margins of parastatal agencies. Changes in government policy toward parastatal marketing agencies and exchange rate reform could improve producer prices, competitiveness and export earnings.

There is also a need for tax reform measures. The Zakat tax, introduced in 1983, has many shortcomings and has added to the costs of marketing. The Zakat tax is another tax in addition to the existing taxes levied by the local authorities. One would have expected the old crop tax to be abolished after the introduction of the Zakat tax.

A last major area of improvement would be public policies in agricultural marketing. There is a need to invest in collecting and disseminating market information. Time and again one would find producers or even assembly traders (lorry traders) moving products from a village or a rural market to an intermediate market and finding prices lower than where they purchased the product. This adds to the marketing costs and inefficiency. In addition, market information would be more meaningful if there were standards and grades introduced and implemented by the local authorities.

A public policy to strengthen agricultural marketing information would improve spatial and seasonal pricing efficiency in the marketing of sorghum and sesame products. In addition, the collection and assembly of time series data on basic measures of market performance would facilitate and improve marketing research in developing countries such as the Sudan. Such changes should improve the process of price formation resulting in

better communication between producers and consumers. Thus, marketing agents will be more efficient in the transfer of commodities in time, place, and form.

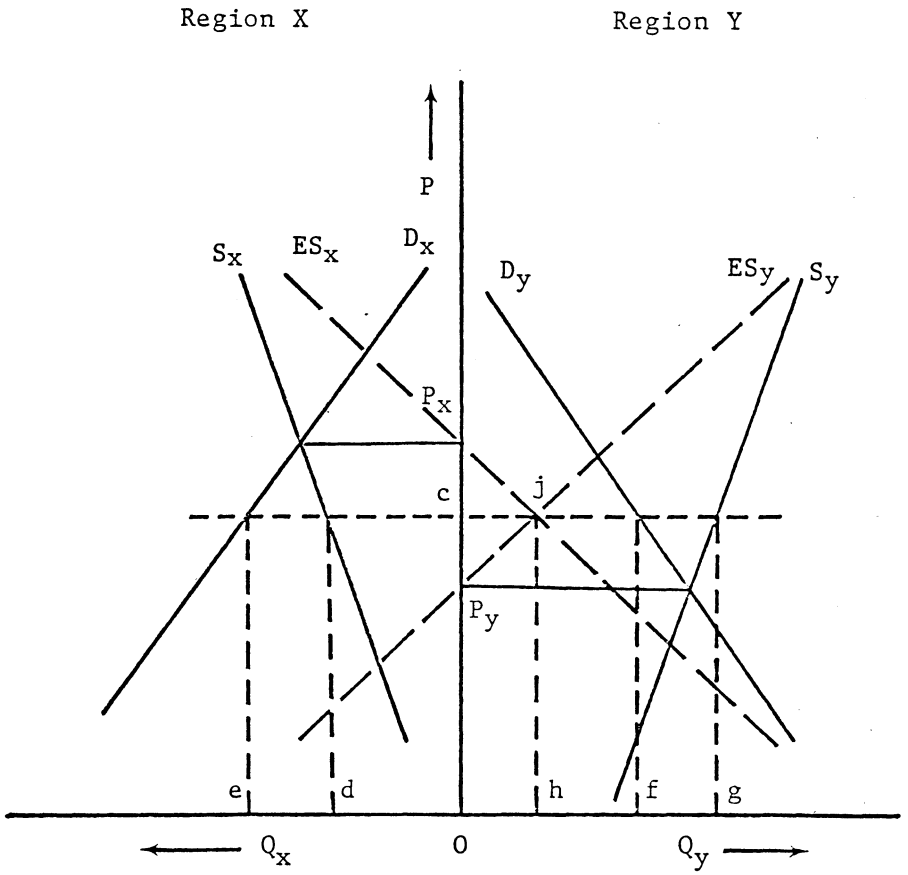

Figure 1: The Equilibrium Prices and Trade Illustrated by a "Back-to-Back" Diagram.
(Bressler and King: p.88)

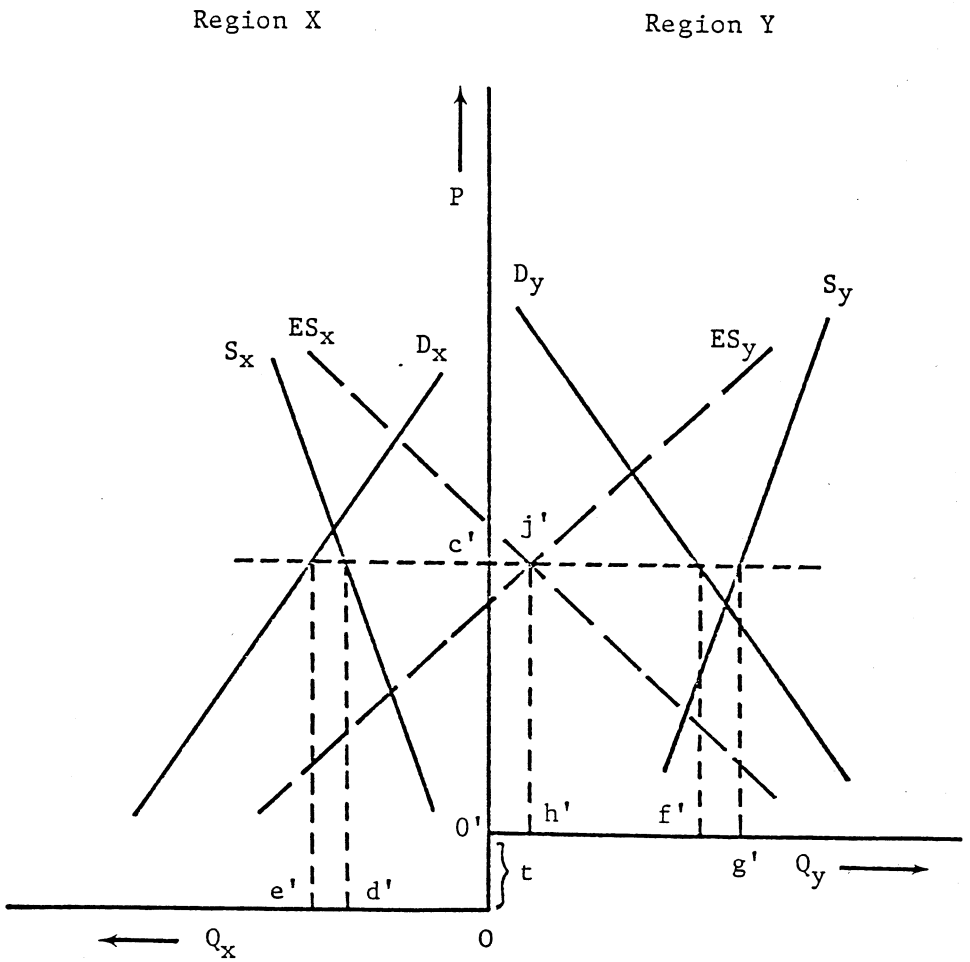

Figure 2: The Effects of Transfer Cost (t) on Prices and Trade (Compare with Figure 1)
(Bressler and King: p.91)

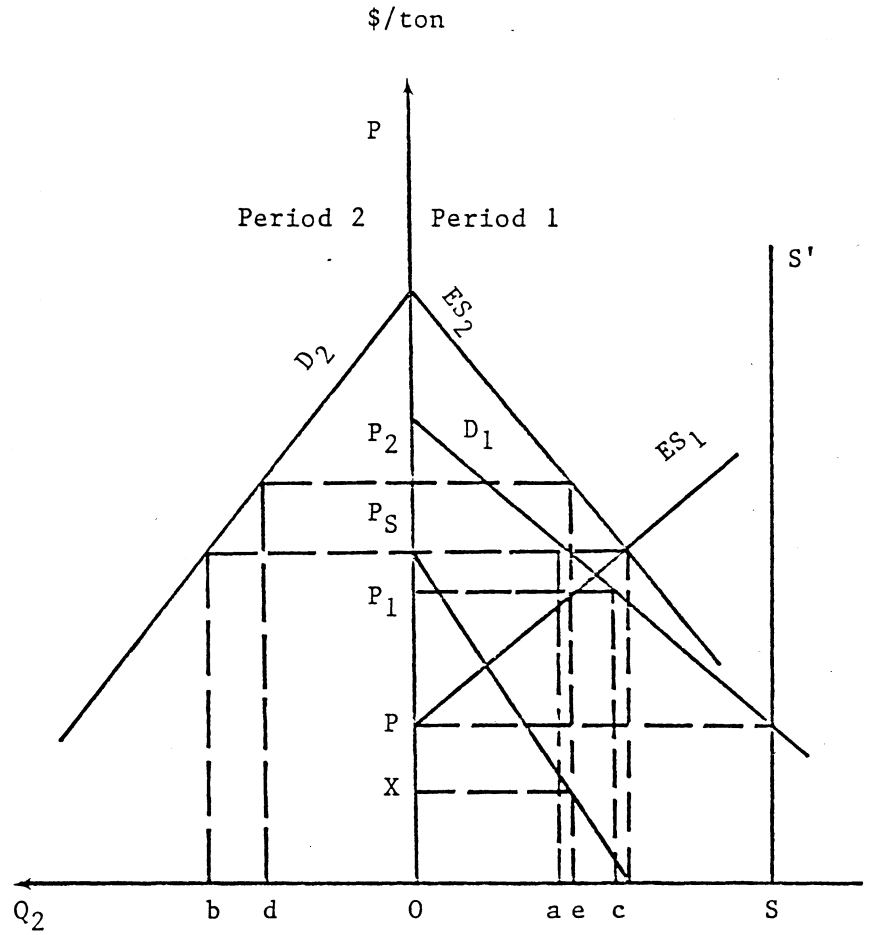

Figure 3: Equilibrium With Storage Costs for Two Periods
(Bressler and King: 208)

Table 1. Average Prices and Marketing Margins for Dura (Sorghum) in Gadarif Production Area and Retail Markets in Khartoum, March-April 1987 (Variety Deber)[1]

Item	LS per ton	Percentage of retail price
Producer price in rural market[2]	194.7	33.5
Assembly trader's gross margin	100.1	17.2
Zakat tax[3]	(16.5)	(2.8)
Local tax	(1.1)	(0.2)
Transport	(33.0)	(5.7)
Handling	(5.5)	(0.9)
Storage	(15.4)	(2.6)
Assembly trader's net margin	28.6	4.9
Gadarif wholesale price	294.8	50.7
Khartoum wholesaler gross margin	162.8	27.9
Transport	(46.8)	(8.0)
Handling	(11.0)	(1.9)
Khartoum wholesaler's net margin	105.0	18.0
Khartoum wholesale price	457.6	78.6
Khartoum retailer's gross margin	124.3	21.4
Handling	(5.5)	(0.9)
Cleaning	(11.0)	(1.9)
Losses	(28.6)	(4.9)
Retailer's net margin	79	13.6
Plus value of empty sack (L.S. 21)	102.3	17.6
Khartoum retail price	581.9	100.0

Source: Field Survey, 1987

Note:

1. Two dura varieties have been dealt with in the survey. These are the most commonly grown varieties. This particular one (deber) is preferred for human consumption especially in urban areas. The other variety (feterita), is a lower quality product.

2. Producer prices are weighted averages of prices given by producers during the field survey.

3. Zakat tax is a religious crop tax that is usually paid by the producer, but assemblers who buy from rural markets claim that they pay it at the central market. However, since they usually deduct it from the producer's price, the tax is actually paid by the producers although it appears as an assembler's cost.

Table 2. Average Prices and Marketing Margins for Dura (Sorghum) in El Obeid Production Area and Retail Markets in El Obeid Town, March-April 1987.

Item	LS per ton	Percentage of retail price
Producer price	267.3	55.2
Village merchant's gross margin	118.8	24.5
Zakat tax	(20.9)	(4.3)
Transport	(55.0)	(11.4)
Handling	(5.5)	(1.1)
Village merchant's net margin	37.4	7.7
Village merchant's price	386.1	79.8
Assembler's gross margin	26.4	5.4
Handling cost	(3.3)	(0.7)
Assembler's net margin	23.1	4.7
Wholesale price in El Obeid	412.5	85.2
Retailer's gross margin	71.5	14.8
Handling and Transport	(22.0)	(4.5)
Cleaning	(11.0)	(2.3)
Losses	(22.0)	(4.5)
Retailer's net margin	16.5	3.4
Plus value of empty sack (at LS 2.5)	44.0	9.1
Retail Price in El Obeid	484.0	100.0

Source: Field Survey, 1987

Table 3. Average Prices and Marketing Margins for Sesame in Gadarif Production Area and Export Markets (F.O.B.) Port Sudan, March-April, 1987

Item	LS Per ton	Percentage of export price
Producer's price[1]	1073.7	68.3
Assembler's gross margin	366.3	23.3
Storage for two months[2]	(45.9)	(2.9)
Transport	(27.0)	(1.7)
Handling	(4.5)	(0.3)
Local tax[3]	(114.6)	(7.3)
Assembler's net margin	174.3	11.1
Assembler's price[4]	1440.0	91.6
Wholesaler's gross margin[5]	384.5	24.5
Local transport	(6.0)	(0.4)
Handling and weighing	(9.3)	(0.6)
Sacks and strings	(44.3)	(2.8)
Packing	(6.0)	(0.4)
Cleaning	(26.7)	(1.7)
Losses	(64.5)	(4.1)
Storage	(6.7)	(0.4)
Interest (two months at 20% p.a.)	(48.1)	(3.1)
Transport to Port Sudan	(84.0)	(5.3)
Port Sudan expenses	(59.8)	(3.8)
Wholesaler's net margin	29.1	1.9
Sudan Oilseeds Company buying price	1824.5	116.1
Port Sudan expenses	85.9	5.5
Storage (3 months)	11.2	0.7
Interest (3 months at 18% p.a.)	82.1	5.2
Total cost	2003.7	127.5
FOB Prices ($530 x LS 2.965/$)	1571.5	100.0
Exporter's net margin	(-)432.2	(-)27.5

Source: Field Survey and Sudan Oilseeds Company, Khartoum

Note:

1. Producer sells at local market, to a village merchant, to an assembly trader, or at the intermediate market.

2. This is the opportunity cost of capital tied up in the stored commodity.

Table 3, Note continued:

3. This is crop tax and market fees paid at the auction market by the selling party.

4. This is the wholesale price at the Gadarif auction market. It could be the selling price of wholesaler merchant, a village merchant, a truck owner who deals in crop buying and selling, or even a producer.

5. These are the wholesalers who deal with the Sudan Oilseeds Company (SOC) which monopolizes the export of oilseeds. Wholesalers sell to the SOC delivery Port Sudan.

Table 4. Average Prices and Marketing Margins for Sesame in the Gadarif Production Area, Processors and Retail Markets, March-April, 1987

Item	LS per kantar of oil equivalent[1]	Percentage of retail price
Producer's price[2]	119.3	39.6
Wholesaler's gross margin	42.5	14.1
Wholesaler's price	161.8	53.7
Processor's gross margin	71.8	23.8
Local tax	(13.7)	(4.5)
Handling	(1.7)	(0.6)
Losses at 3%	(4.9)	(1.6)
Cleaning	(1.0)	(0.3)
Processing[3]	(15.0)	(5.0)
Packing (cost of jerrycans for packing)	(18.9)	(6.3)
Processor's net margin	16.6	5.5
Processor's price of oil & cake	233.6	77.5
Processor's price of oil	200.0	66.3
Wholesaler's gross margin	22.2	7.4
Transport and handling	(1.0)	(0.3)
Wholesaler's net margin	21.2	7.1
Wholesale price oil (1 kantar)	222.2	73.7
Retailer's gross margin	27.8	9.2
Transport and handling	(1.0)	(0.3)
Retailer's net margin	26.8	8.9
Value of empty jerrycan[4]	18.9	6.3
Retail Price of oil	250.0	82.9
Total Retailer's Price (oil and cake)[5]	301.5	100.0

Source: Field Survey, 1987

Note:

1. The oil extraction rate for sesame, using mechnaical pressing is 40 percent, i.e. 1 kantar of oil (100 pounds) requires 2.5 kantars of sesame.

2. Weighted average of producer prices obtained during the field survey.

Table 4, Note Continued

3. Cost of processing per kantar of sesame (2.5 kantars in this case), is given by the mill owner. It includes depreciation of buildings and machinery, cost of labor, insurance, fuel, etc.

4. One jerrycan (plastic container) equals four imperial gallons.

5. Price of cake is the ex-factory price. Animal owners get their cake requirements directly from the factory, i.e. the factory acts as a retailer in this case. Inclusion of the cake price at the retail level is only for the sake of calculating the farmer's share of the consumer's price.

Table 5. Index of Monthly Wholesale Prices of Sorghum and Sesame in Gadarif and Sorghum in El Obeid Markets. 1981-1986

District Crops		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Range
Gadarif														
Sorghum	Mean	98.9	94.8	97.8	96.5	92.3	95.4	94.7	99.5	108.1	109.3	109.1	103.5	16.0
(Feterita)	S.D.	25.1	24.0	24.2	19.6	17.8	22.5	15.8	15.3	30.9	43.1	42.4	40.9	
Sorghum	Mean	92.4	93.3	95.5	95.7	90.8	93.3	103.3	104.6	110.7	116.4	110.3	93.8	25.6
(Deber)	S.D.	10.1	8.1	8.7	7.5	11.3	18.3	22.3	13.7	10.3	12.4	20.1	15.5	
Sesame	Mean	104.7	115.4	103.6	100.8	98.3	96.6	96.7	91.5	90.2	98.7	103.0	100.5	25.2
	S.D.	11.0	15.8	6.5	5.8	7.5	8.7	11.7	9.1	5.0	11.3	4.9	7.0	
El Obeid														
Sorghum	Mean	90.0	95.3	95.9	97.5	100.2	100.1	103.0	105.6	115.8	113.6	95.6	87.1	28.8
(Feterita)	S.D.	14.7	18.0	9.6	10.3	18.1	17.1	20.2	13.8	14.9	18.5	22.4	19.3	

Source: Calculated from Agricultural Prices in Sudan, Department of Agricultural Economics, Ministry of Agriculture and Natural Resources, Khartoum

Note: The index is the average monthly percentage of a twelve month moving average.

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